



STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
BOARD OF PESTICIDES CONTROL
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AUGUSTA, MAINE 04333

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JANET T. MILLS
GOVERNOR

AMANDA E. BEAL
COMMISSIONER

Memorandum

To: Board of Pesticides Control
From: Doug Van Hoewyk
Subject: Updates on PFAS pesticides

September 24, 2026

This memo seeks to provide the Maine Board Pesticide Control an update on the following:

- 1) Interpretation of Maine DEP's PFAS definition. A better understanding of how Maine DEP interprets the PFAS definition increases the number of PFAS pesticidal active ingredients from roughly 50 to about 90.
- 2) Identification of PFAS pesticides that are scientifically known to degrade into trifluoroacetate or are predicted to yield trifluoroacetate; these predictions are based on indirect evidence and will be further discussed. The metabolite trifluoroacetate is the final degradant of many PFAS products, including pesticides. There is scientific consensus that trifluoroacetate is (i) extremely persistent, (ii) increasingly detected in groundwater, and (iii) not bioaccumulative in mammals. The sources of trifluoroacetate are still being explored, but it is widely accepted that aerosols are the major contributors of trifluoroacetate in the environment. However, the human and environmental risks of trifluoroacetate are still being debated. Additionally, the yield of trifluoroacetate from pesticides is a great unknown, and estimates range from ~1% to 100%.
- 3) A review of US EPA dockets on the environmental fate of PFAS pesticides reveals that some are capable of defluorination under natural conditions. The defluorination of PFAS pesticides prevents the formation of trifluoroacetate and challenges the paradigm that all PFAS are "forever chemicals."

ALEXANDER PEACOCK, DIRECTOR
90 BLOSSOM LANE, DEERING BUILDING



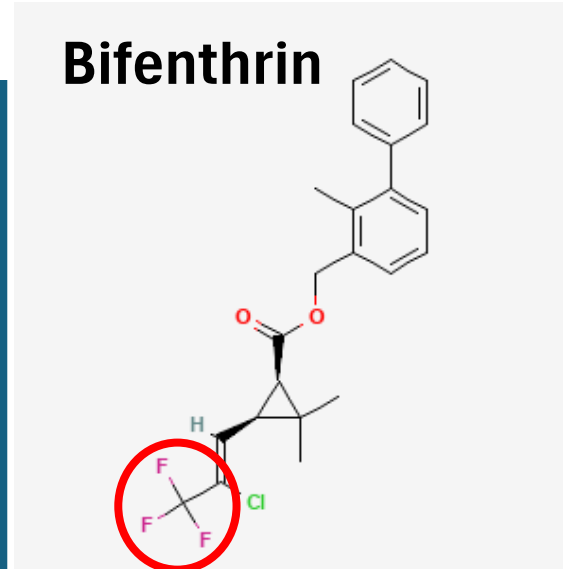
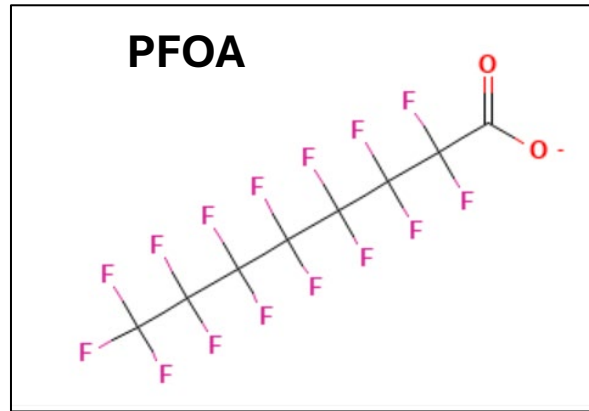
PHONE: (207) 287-2731
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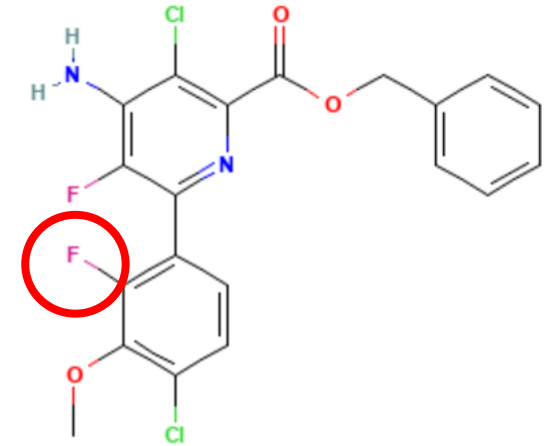
Update on PFAS Pesticides

- 1. Better understanding of how Maine DEP interprets the PFAS definition.**
- 2. Increasing trend in the design of PFAS pesticides.**
- 3. PFAS pesticides can degrade into trifluoroacetate
(direct and indirect evidence)**
- 4. Some PFAS pesticides can defluorinated under natural conditions,
which prevents trifluoroacetate.**

Update: PFAS definitions and interpretations



Florpyrauxifen-benzyl
(found in Procellacor)



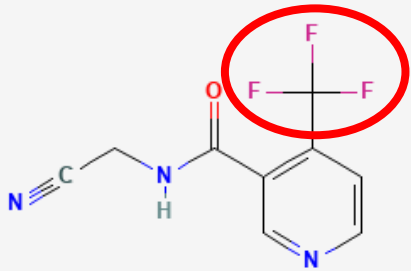
Fluorinated	YES	YES	YES
Maine PFAS	YES	YES	YES
OECD PFAS	YES	YES	NO
EPA PFAS	YES	NO	NO

Maine DEP's interpretation of PFAS increases the number of PFAS pesticides from ~50 to ~90.

Update: PFAS definitions and interpretations

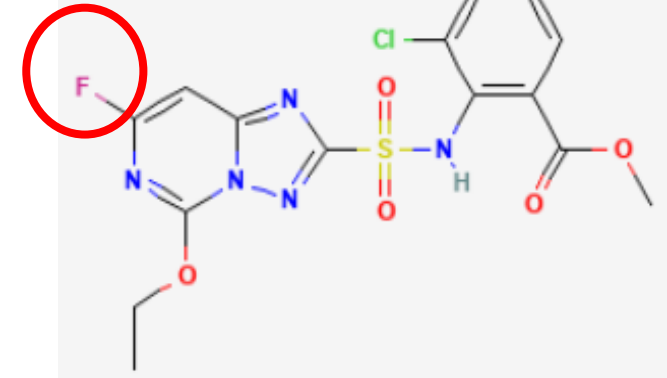
Maine: "Perfluoroalkyl and polyfluoroalkyl substances" or "PFAS" means substances that include any member of the class of fluorinated organic chemicals containing at **least one fully fluorinated carbon atom**.

Flonicamid- insecticide



* Acute toxicity category: III

Cloransulam- herbicide



* Acute toxicity category: IV

Organization for Economic Cooperation and Development (OECD)
definition references one “**fully fluorinated methyl or methylene carbon**.”

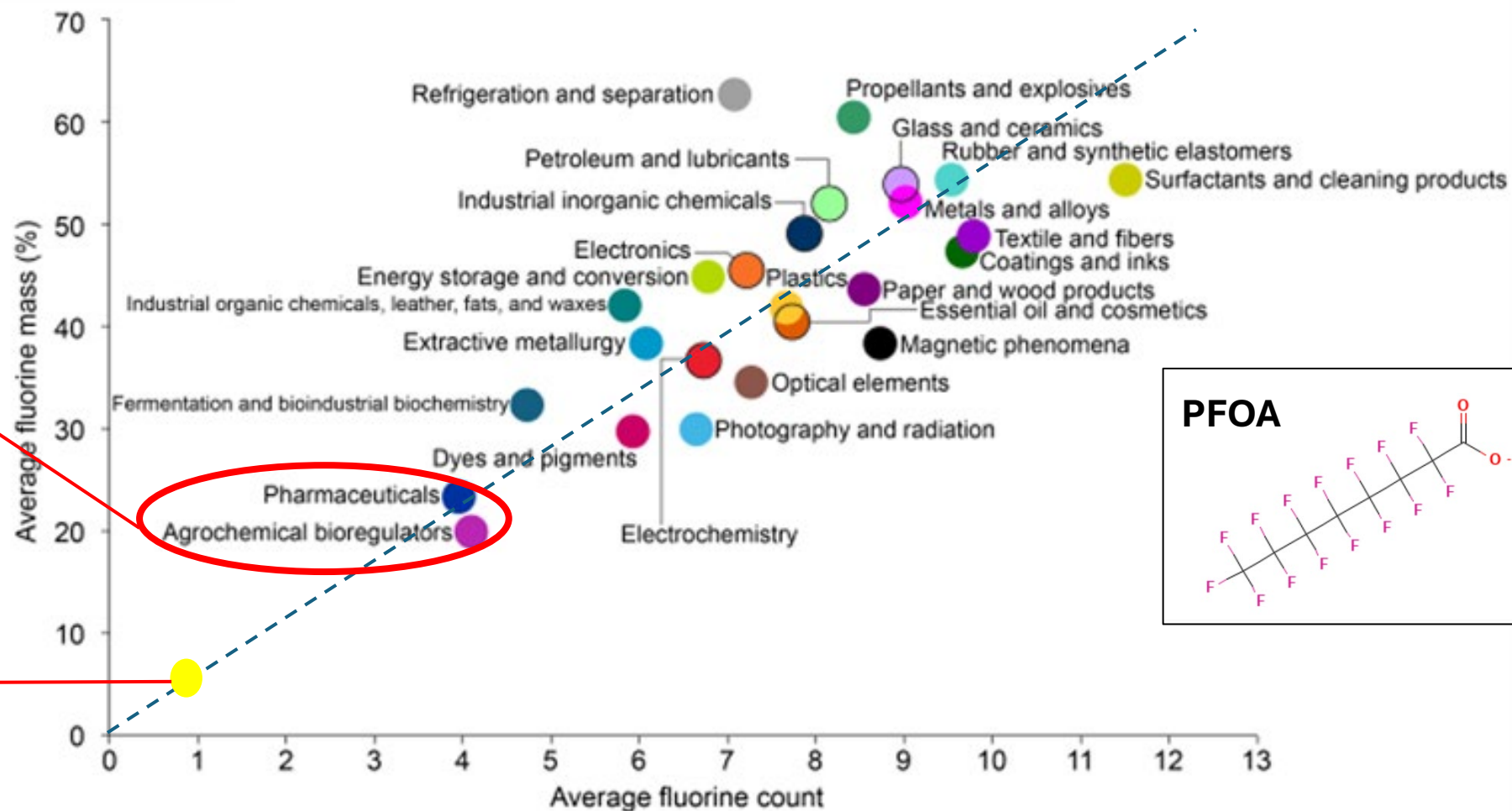
***** The fully fluorinated carbon CANNOT include a double bond or a hydrogen bond**

* Source: https://www3.epa.gov/pesticides/chem_search/reg_actions/registration/fs_PC-129116_29-Oct-97.pdf

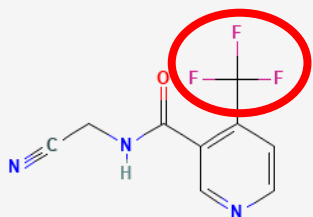
PFAS fluorine mass and fluorine count across 25 sectors

Linking chemical structure patterns to industrial applications

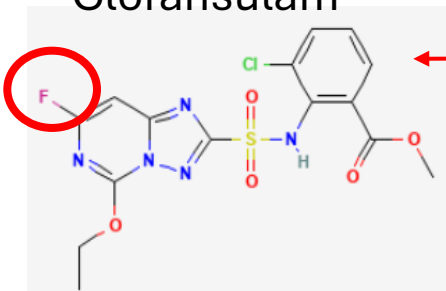
Comprehensive analysis: 350,000 PFAS structures evaluated



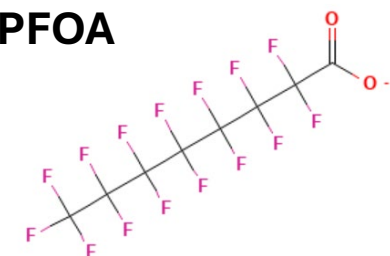
Flonicamid



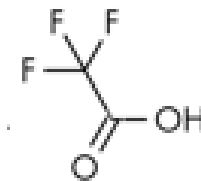
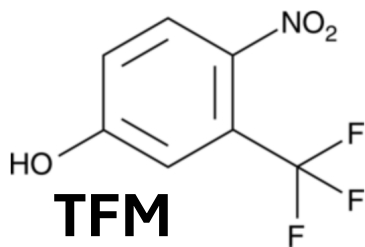
Cloransulam



PFOA



**PFAS pesticides can degrade into trifluoroacetate:
Stuck between a ROC and a hard place**



**Trifluoroacetate,
a Residue of Concern (ROC)**

Increasing trend in the design of PFAS pesticides

Total registered pesticides: ~12%

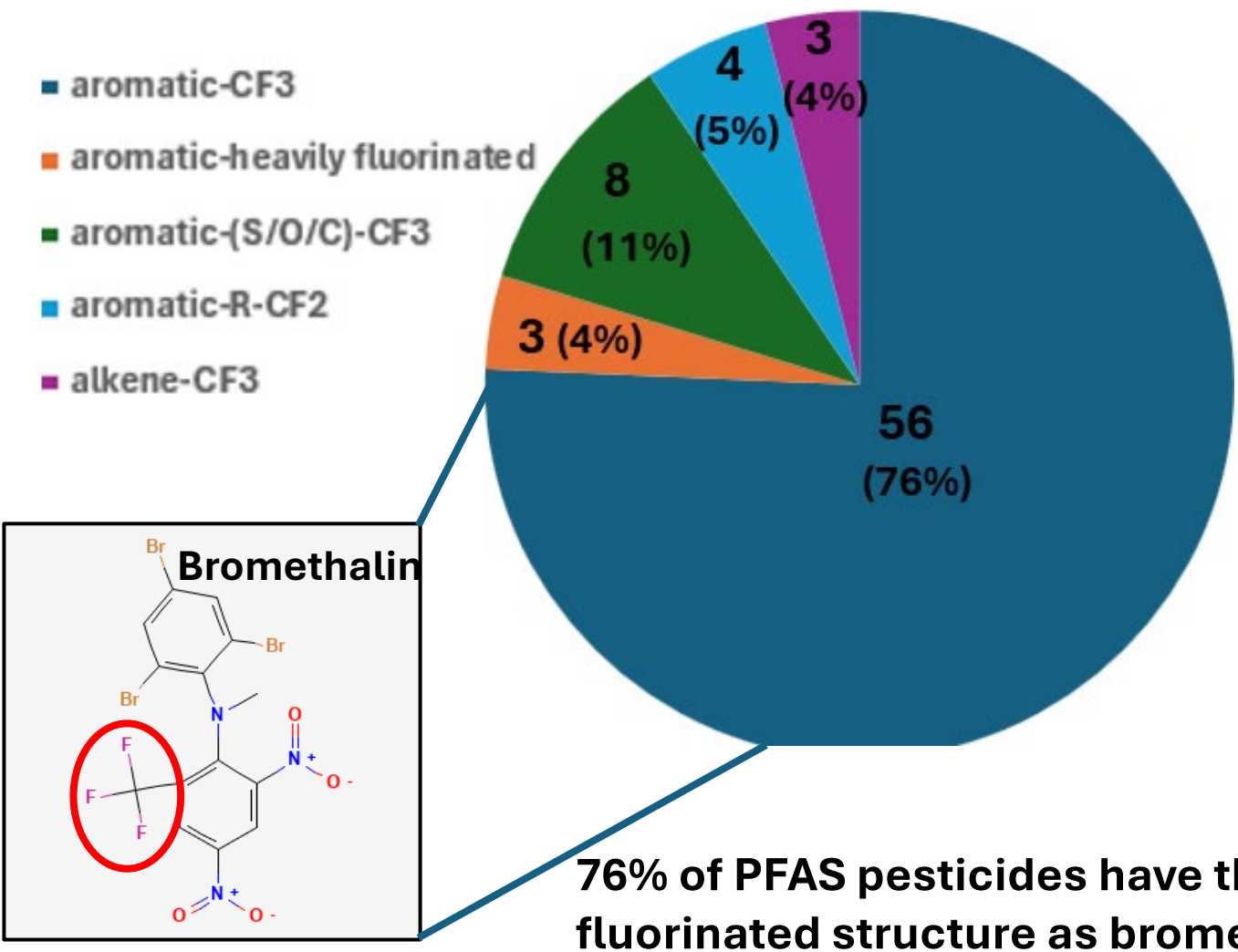
2012-2022: ~30%

2020-2025: ~50%

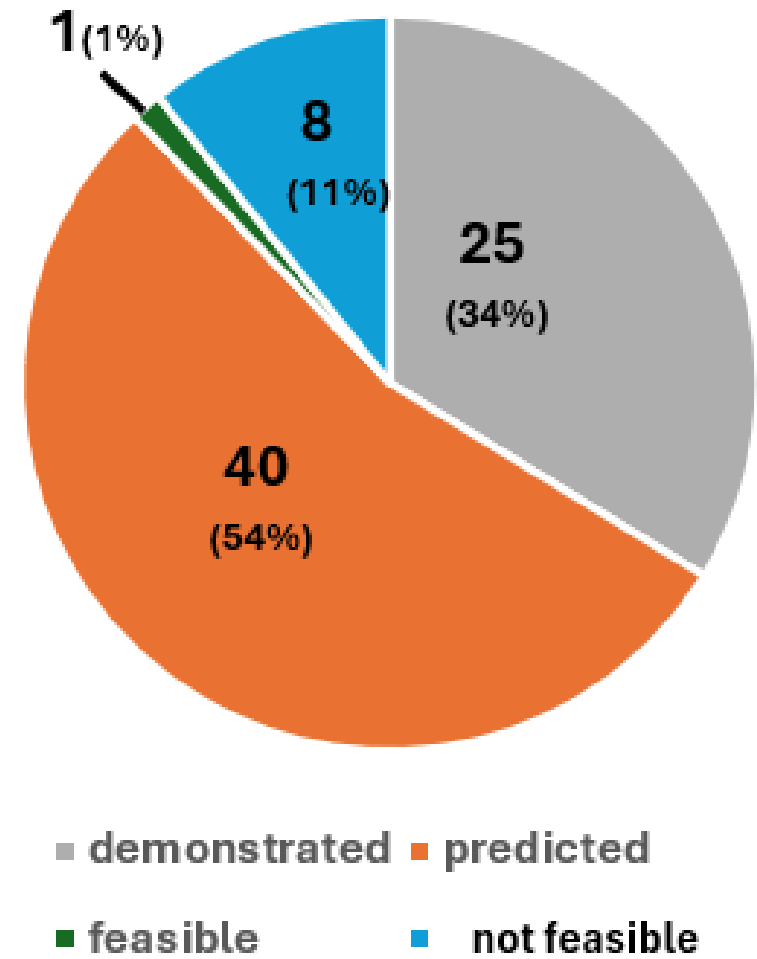
	number	%
total novel active ingredients (2020-2025)	21	100%
Not PFAS	10	48%
PFAS	11	52%
PFAS that could yield TFA	10	48%

Seventy-four PFAS pesticides were assessed in this study

PFAS moiety and structure

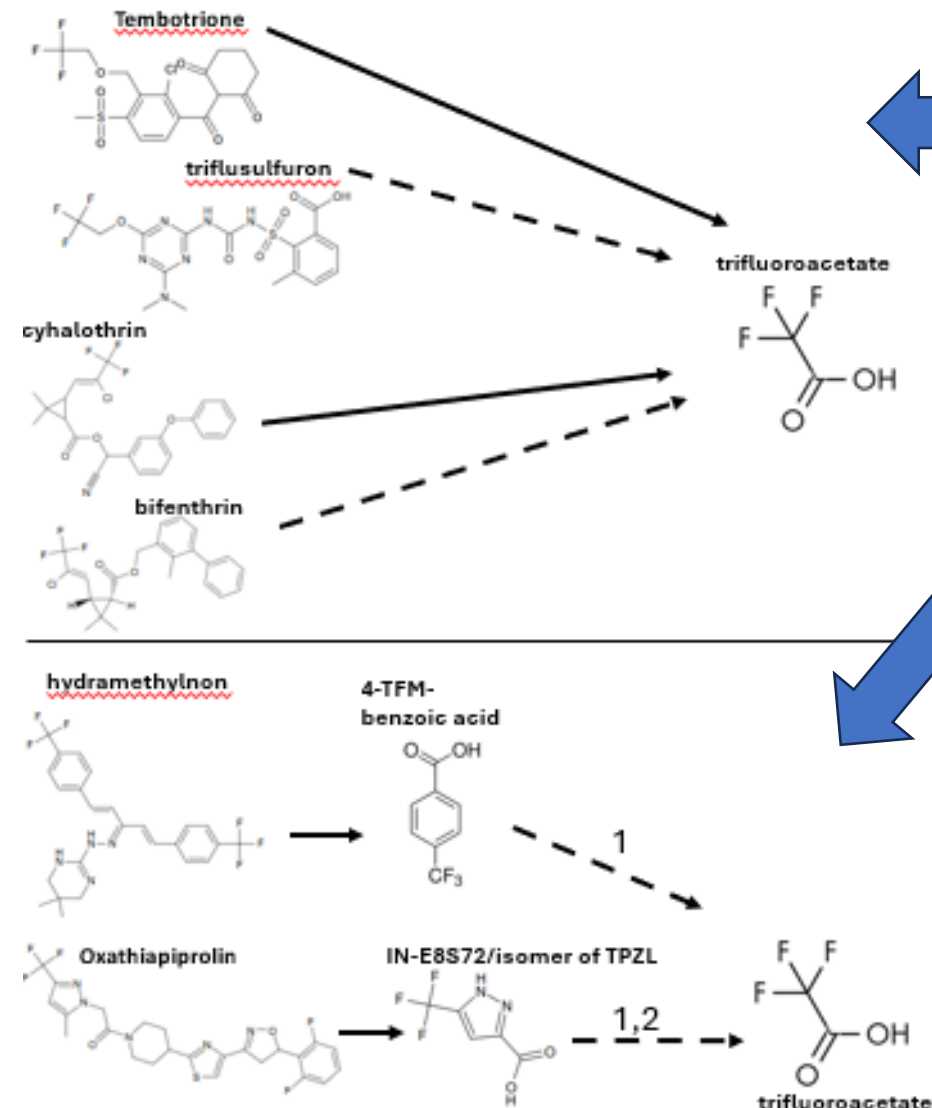


Likelihood of PFAS degrading into TFA



A majority of PFAS pesticides are predicted to still form TFA.

These predictions are based on:

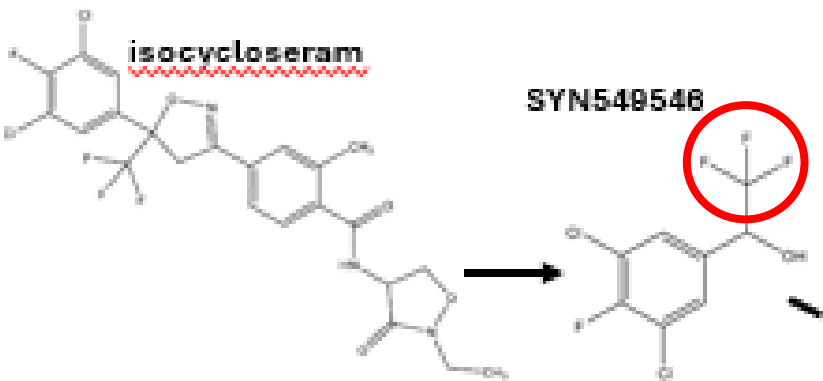
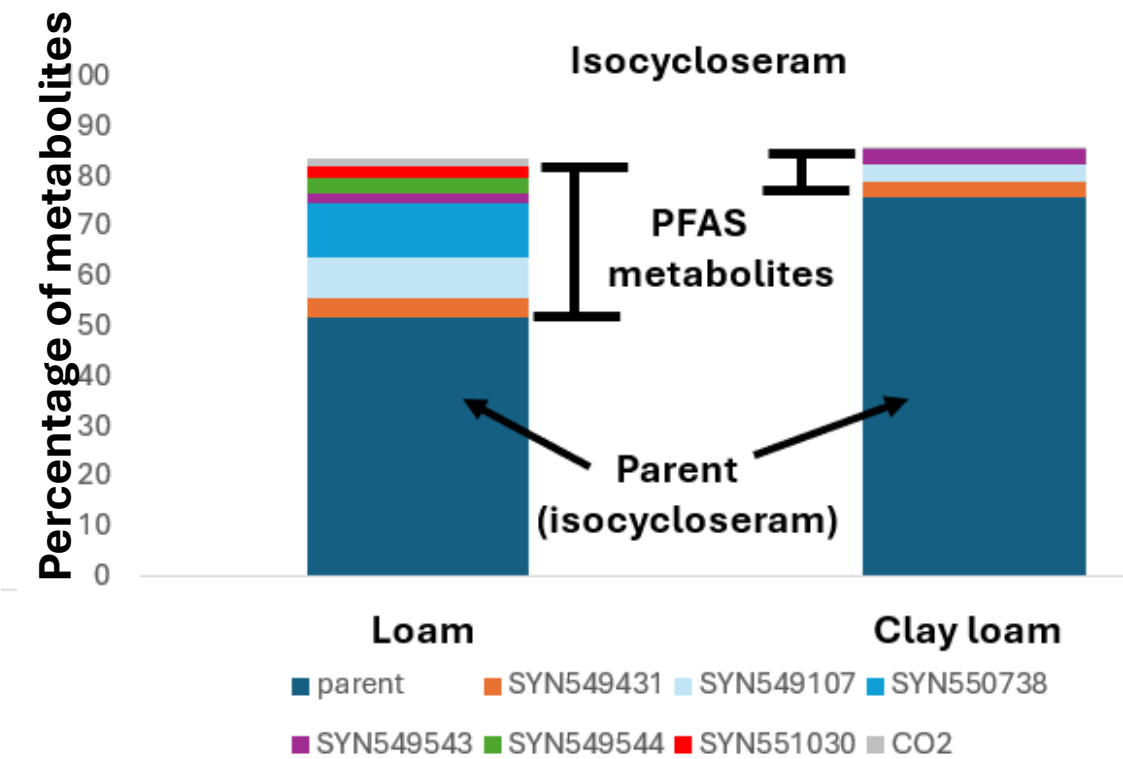


1) structural analogues of PFAS pesticides known to produce TFA.

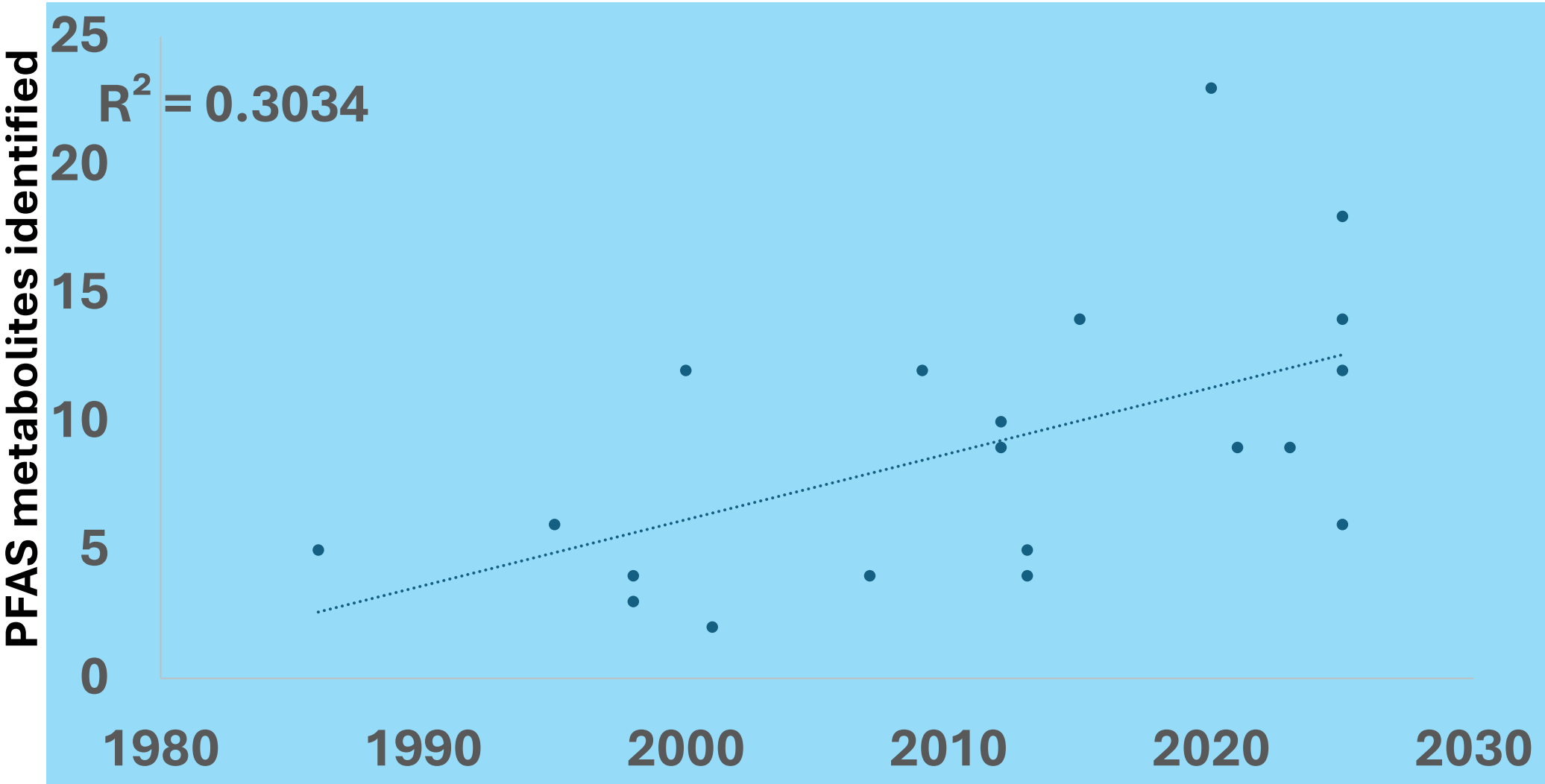
2) PFAS metabolites that academic groups have demonstrated to produce TFA.

3) persistence of metabolites that retain the CF₃ moiety (*e.g.* isocycloseram)

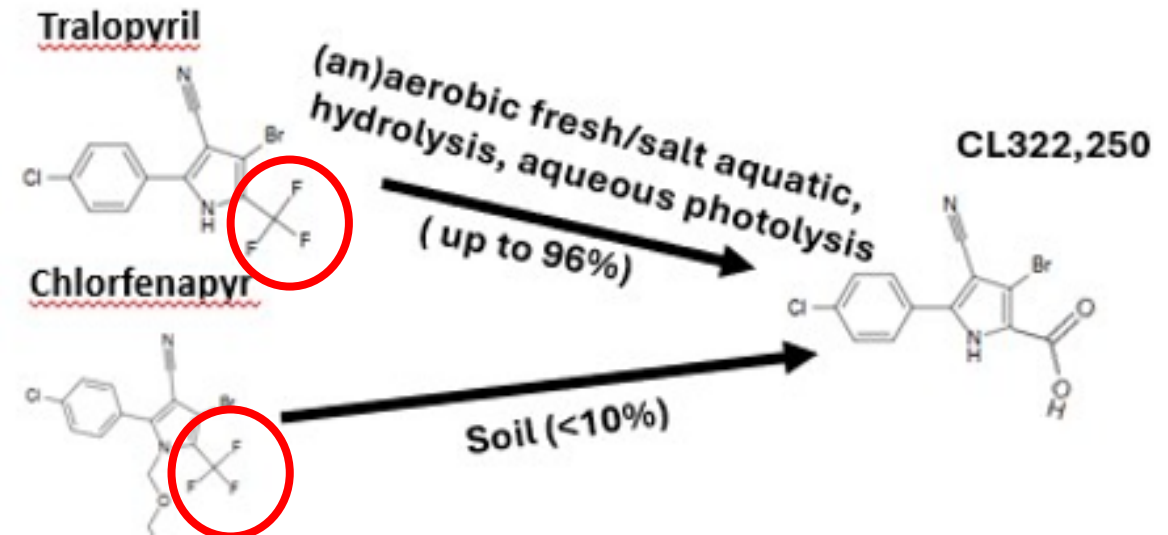
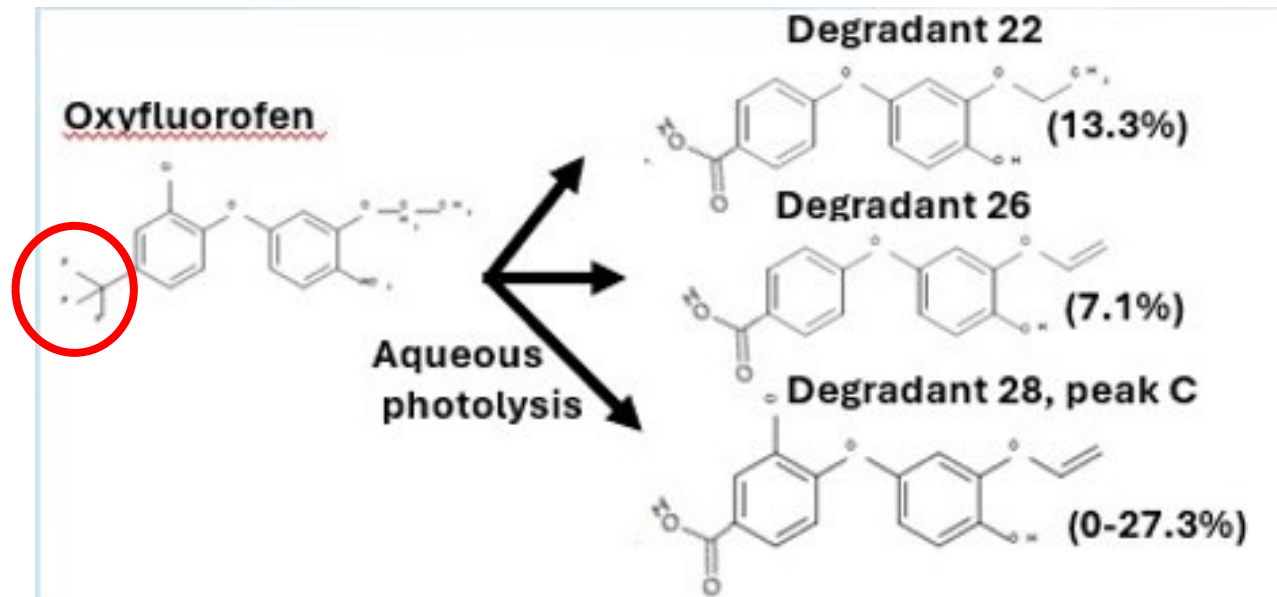
3) persistence of metabolites that retain the CF3 moiety (e.g. isocycloseram) in environmental fate studies.



Environmental fate studies demonstrate that the number of PFAS degradants produced by a PFAS pesticide is associated with its registration year.

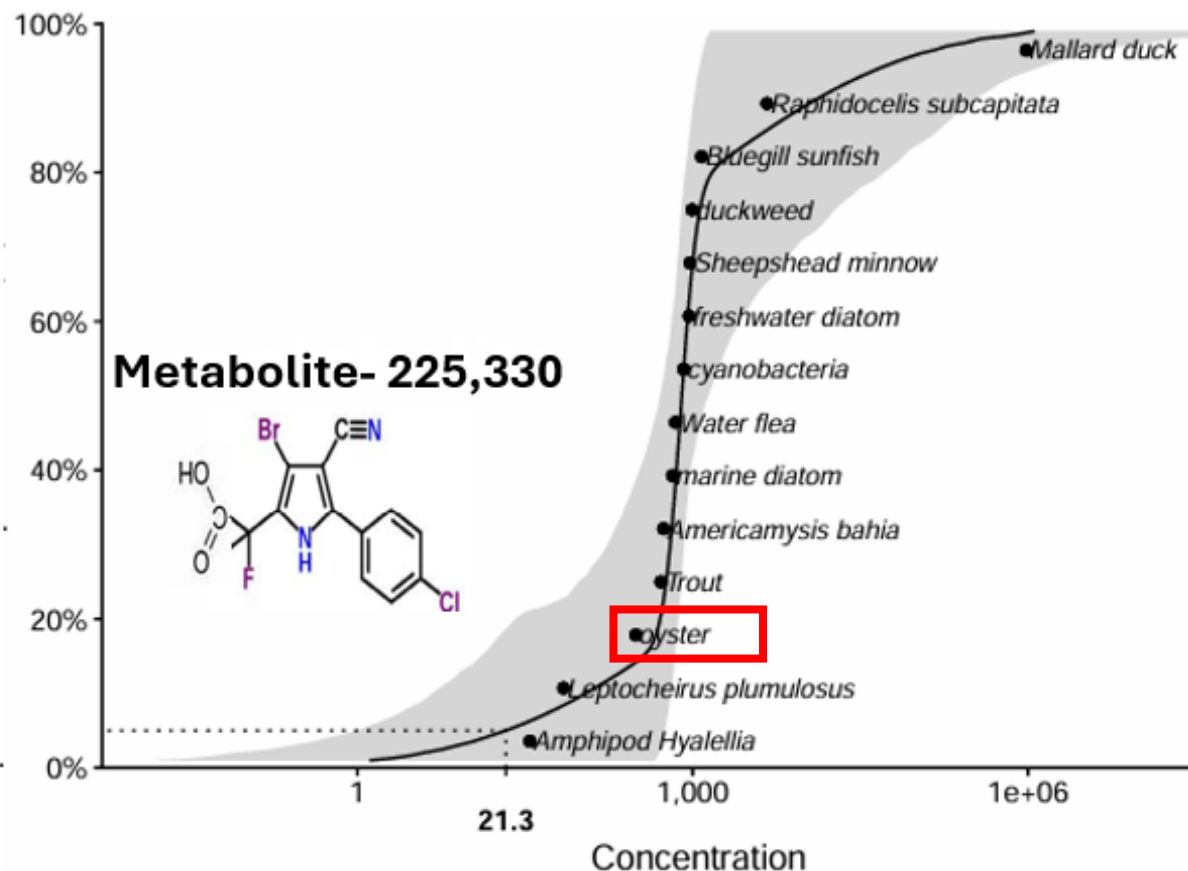
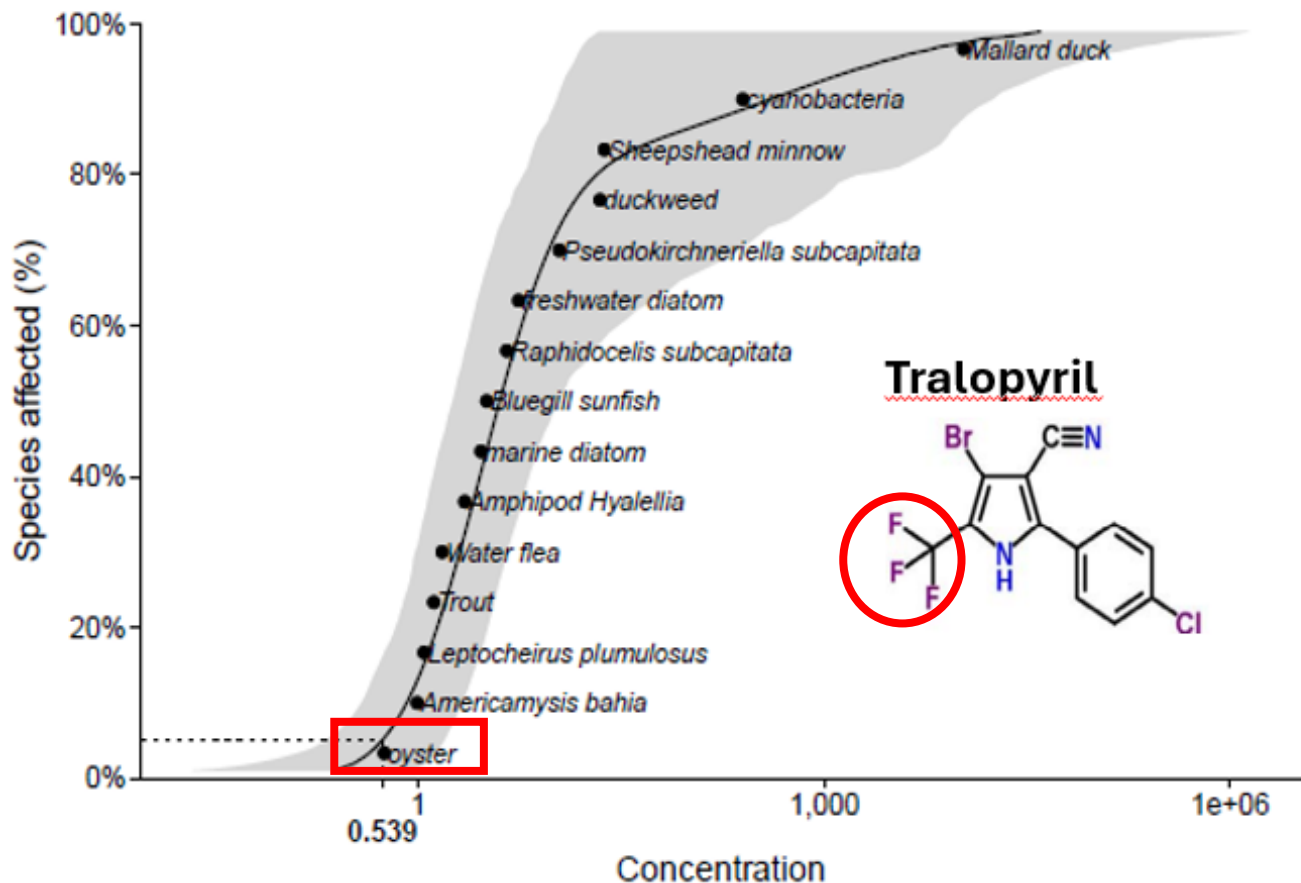


US EPA environmental fate studies reveal a few tendencies for defluorination of PFAS pesticides under natural conditions. This prevents the formation of TFA and challenges the “forever chemical” paradigm.



Species sensitivity distribution (SSD) demonstrates utility of the CF₃ moiety in the design of pesticides.

- SSD is a method used in toxicological studies to guide regulatory decisions



The fluorination of tralopyril decreases the dosage to control oysters by ~1000 fold, and greatly decreases adverse effects to non-target organisms.